

REALIZING THE VISION



Making the services described in the preceding section a reality will take unprecedented cooperation between all levels of government and between the public and private sectors. A big challenge will be to develop systems that are compatible across geographical areas and that can be integrated across modes and link public infrastructure with consumer and commercial products. This challenge and some solutions are discussed under “Systems Integration.” Realizing technology’s promise will also take a new approach to doing business in transportation, and that will entail overcoming some critical legal and institutional barriers. These are summarized in “Institutional and

Legal Issues.” The state can play a key role in setting the stage for ATS partners to work together, helping meet California’s mobility challenges and positioning California’s industries favorably in emerging, international markets. A number of state policy and legislative initiatives are proposed in this regard. Finally, Caltrans, as the state’s transportation steward, must attract and keep successful efforts to provide enhanced mobility in California.

Systems Integration

Issues

Systems Integration

Issues

- **Public Infrastructure & Private Markets**
- **Modal/System Interfaces**
- **Geographically Compatible Systems**
- **Adaptation to Existing Infrastructure**
- **User Service Compatibility and Synergy**

Solutions/Approaches

- **Systems Modeling and Compatibility Planning**
- **Advanced Planning Tools**
- **Cooperative Research, Development, and Testing**
- **Cooperative Systems Architecture Development**
- **Building Block Deployment**
- **Standards Setting**

Deployment of ATS will occur as the result of decisions made by individual consumers; those in the private sector providing goods and services; transportation providers, and government. Market research, deployment plans, outreach and evaluations of field tests and demonstrations are among the resources the general public, industry and public agencies will use when deciding to deploy ATS.

Deriving the greatest benefit from ATS will require integration on a systemwide basis. One of the major ways in which the ATS Program Plan addresses and responds to this challenge is through the identification of need and opportunity for partnerships. Partnerships (public, public/private, private) are required because deployment will be accomplished by many different organizations responding to different user/customer needs, and each participant has something unique to give to the integration effort. Experience with and opportunities for partnerships can readily be seen throughout this ATS Program Plan.

The ATS integration challenge has a number of facets:

- **Public Infrastructure & Private Markets -** Technologies deployed on public facilities and services and those made available to commercial and consumer markets need to be mutually supporting. That is, public technology investments must consider technical compatibility with, and support for, market products and services so that integrated, effective systems result. In addition, transportation decision makers will have to be aware of technological opportunities emerging in the marketplace that might forward mobility goals, even those beyond traditional transportation markets. Nowhere is this more evident than in the budding telecommunications revolution that will almost certainly open entirely new avenues for delivery of mobility services in vehicles, homes, offices, and other locations. Equally important will be stimulating market responses that forward California’s broad mobility goals. Technical compatibility is only one aspect. A more difficult challenge is providing products and services that allow transportation providers, public and private, to better manage their systems and that result in enhanced, better integrated, mobility services for Californians. Realizing the ATS vision will require careful consideration of the operational characteristics and impacts of market products and services. Those with positive attributes will need to be encouraged without overly managing the marketplace.

- **Modal/System Interfaces** - ATS visions, such as personalized public transportation (with its “door-to-door” connectivity); corridor and areawide traffic management, and “seamless” intermodalism require, by their very definition, that different modes/systems, be connected and coordinated. This is very different from the way the transportation system currently works.

Today, many investment decisions and technology selections are made independently by transportation providers, with little thought given to integration, or enhanced or multiple-use opportunities. In the private sector, market-edge considerations and separation from public sector decisions underlie this independent approach. In the public sector, modal and jurisdictional competition for funds, years of inflexible funding categorization, and general jurisdictional fragmentation (see “Institutional and Legal Issues”) have resulted in disconnected and often incompatible transportation systems. This has also resulted in very narrow and closed definitions of transportation modes, which often ignore and even discourage pursuit of integration opportunities and new modal service options.

ISTEA and conforming state legislation address these shortcomings, and start to clear the way for ATS approaches.

Nevertheless, a key challenge will be to cooperatively develop interface and operational specifications in an environment that, although improving, is not particularly suited to such endeavors.

- **Geographically Compatible Systems** - Disparity of ATS approaches and technologies is to be tolerated and even encouraged through research, development, testing and evaluation stages to ensure that the best possible user service systems are identified. However, it is vital that ATS deployments across California and the nation are connected and compatible. ATS market opportunities are best pursued on the national and international scale. A “California-only” approach, separate from the other 49 states, is not proposed. What is being proposed is an ATS vision that works for all people in both urban and rural California. This vision of compatible systems positions California business at the cutting edge of national and international markets, and provides for the connectivity and compatibility of transportation systems across the nation.

Systems Integration

Issues

- **Adaptation To Existing Infrastructure -**
The evolutionary nature of ATS deployment, as described in the previous section, means that these technologies must also be integrated into the existing transportation infrastructure. This, in turn, means that ATS services must be able to function simultaneously with other systems and services that do not necessarily have similar or even current technology. This aspect of system integration is especially important in the vehicle control and automation elements of ATS.
- **User Service Compatibility And Synergy -**
Finally, the myriad user services described in the previous section, and their evolutionary integration, will require that substantial examination be given to how these services might interact with one another. Some will be mutually supportive, while others might cancel each other out. This issue is similar to that regarding TSM measures and the TSM “toolbox” which has been discussed and researched for over a decade. Many ATS approaches could be considered TSM, enhanced with very powerful and robust technological tools. Potential impacts (positive and negative) and opportunities for synergy are, therefore, much greater than with traditional TSM. Of course, the system level analysis required here will need to address mobility, safety, and environmental and economic impacts.

Some approaches that are being taken to address these five aspects of system integration include:

- **Systems Modeling And Compatibility Planning** - New modeling tools are being developed by Partners for Advanced Transit and Highways (PATH) to analyze the system-level aspects of ATS technologies and strategies. Data from research and operational field tests around the world will be put into these models as results become available. Using these models, mobility, safety, environmental, and economic impacts can be quantified and issues more precisely framed for decision makers. User services interactions and synergies can be better identified, leading to the development of consistent and compatible user service “packages” to address the range of policy (mobility, air quality, equity, etc.) and market objectives. Together with work under the auspices of the Transportation Research Board (National Academy of Sciences) and the United States Department of Transportation’s (USDOT’s) technology program, these models will also enhance ATS Program managers’ ability to plan for the joint research, development and testing of logically grouped user services. Related research at PATH and elsewhere is addressing technical integration issues such as interface requirements, communications, system design, operational optimization and reliability (including maintenance requirements), automation, and phased introduction of technologies into existing facilities and services.

The products of these efforts, along with the results of early and strategic deployment plans (see Early Deployment Plans and Southern California ITS Priority Corridor, pages 77-78), will be available for regional agencies to use in preparation of their regional plans and programs. They will also be available for use by other governmental agencies, the private sector and academia.

- **Advanced Planning Tools** - Along with new techniques that expand travel possibilities, new tools are required to understand the effects of these new technology systems and their use. Research is needed for improving the decision support tools that are used in short- and long-range transportation and land use planning, to encompass a holistic approach to statewide and regional system design and management. It is particularly important to identify and define the elasticities that exist between the various modes, and the corresponding time and costs related to those modes. The decision maker needs to know how improvement of one mode will affect another mode in order to make decisions that are best for the total system.

Systems Integration**Solutions and Approaches**

- **Cooperative Research, Development And Testing** - Cooperation between all involved parties, public and private, in the research, development and testing phases will be critical to successful systems integration. These are the phases when public policy objectives, mobility approaches, technological capabilities, system requirements, and market considerations can be jointly discussed and explored, leading to mutually supportive and compatible technology deployments across sectors and jurisdictions. Cooperative research and development is a basic feature of the Caltrans ATS Program and USDOT. A number of institutional barriers must be overcome in this regard, however. These are discussed later in this chapter, followed by a discussion of state initiatives and ATS Program delivery strategies to allow and engender cooperative efforts.
- **Cooperative Systems Architecture Development** - Systems architecture presents the total perspective to aid in the analysis, design and integration of the individual technology building blocks while taking into consideration the needs and constraints of the transportation system as a whole. Within this context, both technical and institutional issues are addressed. Also, results from ATS compatibility planning, research and testing are incorporated. Caltrans is participating on one of four teams that are helping define a national Intelligent Transportation System (ITS) architecture by 1996. Each team is comprised of ATS partners from government, industry and academia. Each is charged to:
 - Define an integrated ITS design and operational framework that will determine not only the functions of individual components, but their connectivities (design) and interrelationships (operation); and,
 - Synthesize and integrate the various components and subsystems as they are being developed, produced, and deployed to ensure their connection, the correction of deficiencies, and elimination of duplication and unwanted redundancies.

By 1996, therefore, California and the nation should have a mutually agreed-upon framework in which to pursue broad ATS deployments in both public infrastructure and private markets.

- **Building Block Deployment** - In the meantime, the ATS Program’s building block approach to technology will allow for near-term deployment of useful products and services from “stand-alone” systems that, with a system architecture in place, can evolve into more comprehensive services enabled by more powerful and integrated systems. Even in the longer term, this modular approach will improve flexibility and effectiveness in tailoring ATS deployments to special conditions and/or objectives.
- **Standards Setting** - A final critical element in meeting the system integration challenge is the widespread acceptance of standards by ATS partners. Under legislative direction (Title 21, CCR, Section 21 [chapter 16; article1]), Caltrans has already developed a standard specification for automated vehicle identification that is enabling electronic toll collection on toll facilities statewide and that will facilitate the deployment of other ATS applications that involve vehicle-roadway communications. Caltrans is now working with USDOT, ITS America and others to explore ATS standards issues and to coordinate standards setting. This is an area that needs careful planning to avoid premature, overly constraining standards on the one hand, and lost market and system integration opportunities from delayed standards on the other.

The challenge to past efforts to add electronic functions and devices to vehicles has not been the ability to specify and procure devices, but rather how to get an assortment of devices from different manufacturers to integrate and work together as a system on the vehicle. Further troublesome

issues often developed around sole source procurements encountered when initial investments were made in proprietary systems and the initial provider was the only source who could furnish additional devices or enhancements. To alleviate this situation, a joint Intelligent Vehicle-Highway System (IVHS), Federal Transit Administration (FTA), and Society of Automotive Engineers (SAE), standard for a Vehicle Area Network (SAE-J-1708 “Serial Data Communications Between Micro-Computer Systems in Heavy Duty Vehicle Applications”) has been issued. This standard has already seen many successful applications by bus manufacturers.

The national systems architecture effort is expected to drive national standards in the following areas:

- Vehicle/infrastructure interfaces which will help public infrastructure/private market integration; and,
- Infrastructure standards to facilitate the introduction of ATS technologies into existing infrastructure and their deployment across modes and jurisdictions and between public and private transportation providers.

These standards will represent the implementation of a national system architecture for much of ATS, but are not the whole story. Current national efforts only address ITS, not all ATS elements, which include a strong infrastructure construction and maintenance element; high-speed ground transportation; and, air and marine transport. Also, standards setting is always a dynamic process, with new needs and technological opportunities continually demanding consideration. There is no reason to believe it will be any different for ATS.

Institutional and Legal Issues

Broad policy endorsements from ISTEA and supportive state legislation have smoothed the way for the design and development of innovative and visionary technology. Today's picture is bright although some legal and institutional barriers exist which could delay the realization of the ATS vision. Caltrans has identified several areas requiring attention. There are issues that must be addressed in the early research and development phases at different levels of government. Some will require joint resolution. The following issues and objectives are currently being explored:

National or Joint Resolution:

- **Anti-Trust** - Develop cooperative research, development, and production agreements to enable public/private joint ventures which will facilitate commercialization, and provide for anti-trust protections;
- **Tort/Product Liability** - Promote joint research and development and technology commercialization by managing liability exposure to private and public organizations;
- **Privacy Issues** - Develop state policy to ensure that the privacy of the citizens of California is protected in their use of any and all ATS deployments in California involving governmental entities;
- **Product Qualification** - Develop efficient and defensible product qualification processes to spur commercialization of appropriate technologies;
- **Air Quality and Other Environmental Concerns** - Develop cooperative research and development programs to determine air quality and other environmental impacts of new technology; and,

- **Market Uncertainties and Risk** - Identify potential markets for products and services. This task is different from outreach and should include an assessment of the willingness of prospective purchasers, both public and private, to pay for ATS. Among possible benefits for public agencies is an estimation of lowered costs or increased revenues from deployment of ATS.

State Resolution:

- **Planning and Programming** - Strengthen close coordination between Caltrans, regional and local agencies throughout California, and the transportation planning and programming process to achieve mutually inclusive objectives of both programs and to pursue coordinated ATS testing and demonstration, evaluation and deployment. Cooperative partnerships are the key element in the planning and programming of transportation. This cooperative interaction enables agencies at various levels of government to conduct long-range multimodal planning and negotiate a variety of projects best suited to serve the traveling public and the transportation system;
- **Partnering And Collaboration** - Establish workable mechanisms for joint public/private collaboration in a true partnership (versus contractor) environment;
- **Government Procurement** - Develop state procurement processes that encourage the use of ATS technologies on public infrastructure which have the lowest life-cycle cost, replacing current low bid, minimum compliance approaches that discourage effective innovation; and,
- **Competitiveness of California Companies** - Implement processes to enhance competitiveness of California firms by supporting their efforts in new technology development.

California enjoys real opportunities and strengths in assuming leadership to overcome institutional barriers and to set the stage for a 21st century transportation system. With the decline in the defense industry, many qualified, technologically advanced companies are taking an interest in the transportation market. This interest can lead to meaningful and beneficial partnerships between the public and private sectors to solve growing transportation problems. A balanced leadership role for California consists of developing and demonstrating advanced systems in cooperation with the federal government, other states, and private companies.

California's opportunities and strengths for ATS leadership include:

Opportunities

- Obtaining federal funding authorized by ISTEA;
- Sharing the potential federal resources from economic stimulus and defense conversion initiatives;
- Influencing emerging national standards for ATS technology;
- Helping California companies develop exports of transportation products for potentially large international markets;
- Encouraging development of transportation systems with positive effects on mobility, safety, air quality, energy, and quality of life; and,
- Establish a stable funding environment for the Caltrans ATS Program which can be used to encourage broad partnership involvement in ATS activities.

Strengths

- California's historic leadership role in advanced technologies, research and development;
- A large and diverse industrial base for advanced technology development;
- A high level of consumer acceptance for new and innovative products;
- An existing, major transportation management systems development program;
- Partnerships with outstanding educational institutions;
- Highly trained professionals in the educational and technical fields; and,
- California's early recognition of the importance of applying advanced technologies to improving transportation (an existing world-class ATS Program at Caltrans).

To enable California to be a leader in realizing the ATS vision, state government must assume a leadership role itself. First, through its broad policy-making and legislative powers and authorities, the state of California, and its agencies, need to set the stage for successful collaborative efforts among public and private partners in this field. The state has already taken on this role, establishing clean fuel programs at its energy and air quality agencies, charging its trade and commerce and other agencies with pursuing defense conversion opportunities, and chartering a comprehensive exploration of economic opportunities in transportation technologies through the "Project California" initiative.

State Policy and Legislative Initiatives

Secondly, the state must ensure that a foundation is established in the public infrastructure for building broader ATS mobility systems and markets. The state has also assumed leadership by establishing and funding an anchor ATS Program at Caltrans (Chapter 352, Statutes of 1992, AB3096-Katz). How Caltrans has and will carry out this charge is explored in the ATS Program Overview beginning on page 22.

Immediately following are recommendations for state policy and legislative initiatives that, in Caltrans' view, will support ATS and related economic endeavors as identified in Project California; help overcome many of the institutional barriers cited earlier; greatly facilitate ATS Program delivery by Caltrans; and, solidify California's leadership in transportation and advanced technology development.

Recommendations for state policy and legislative initiatives:

- **Streamlined Partnering Arrangements for Caltrans ATS Program**

Pass legislation to:

- Allow Caltrans to use cooperative agreements with other public agencies for ATS projects regardless of mode or involvement of a state highway element; and,
- Establish flexible, streamlined solicitation and contracting procedures for involving the private sector in ATS Program activities.

This initiative would maximize the leverage of ATS Program funds by allowing Caltrans to efficiently pursue multi-jurisdictional and public/private partnerships (including those with the corporate entity proposed below), and other cost-sharing opportunities. Proposed legislative language will be developed by Caltrans to initiate this concept.

- **Grants and Loans for ATS Innovations by Small Business**

It may be advisable to establish and fund a program of grants and loans for small California businesses to develop marketable products which are consistent with the goals of the ATS Program. Caltrans, or another appropriate entity could administer this program. Caltrans will monitor this issue.

- **Liability Containment for ATS Research and Testing in California**

California has the potential to be a magnet for advanced transportation research and development if it can provide private industry with liability protection beyond what is available elsewhere during development and testing phases. Options include legislatively containing liability exposure, establishment of a liability pool or superfund, and/or providing partial governmental coverage on selected research and development activities. The establishment of clear, justified design standards in order to reduce liability is an essential component in liability containment. Caltrans will carefully study this issue in concert with its ATS partners and develop specific recommendations and guidelines at a later date.

- **Regulation of Telecommunication Technologies and Regulation-free Test Zone**

The California Public Utilities Commission (CPUC) should review regulations governing the telecommunications industry and recommend appropriate changes to laws that restrict the introduction of innovative new telecommunication technologies. As a precursor, and if feasible, the CPUC should establish a regulation-free test zone in California to allow demonstration and evaluation of state-of-the-art telecommunication products with potentially beneficial mobility impacts.

State Policy and Legislative Initiatives**State Strategic Initiatives**

- Streamlined Partnering Arrangements for Caltrans ATS Program
- Non-profit Corporation for ATS Commercialization
- Research and Development Center
- Grants and Loans for ATS Innovations by Small Business
- Liability Containment for ATS Research and Testing in California
- Regulation of Telecommunication Technology and Regulation-free Test Zone
- AVI Procurements for Public Fleet Vehicles
- Privacy Protection in ATS Deployment

- **Automated Vehicle Identification (AVI) Procurements for Public Fleet Vehicles**

A significant barrier in delivering ATS services to the people of California is the lack of accurate and timely (real-time) information on transportation system conditions in most regions in the state. A particularly cost-effective way to overcome this barrier would be to equip public fleet vehicles (buses, cars, vans, etc.) with electronic tags for Automated Vehicle Identification (AVI) consistent with the current, legislatively mandated state standard for AVI. The vehicle-based equipment would be of negligible cost to fleet operators, and, together with tag readers on the transportation infrastructure, could provide real-time level of service information to transportation and fleet management centers throughout California. By taking advantage of this existing technology, fleet managers could realize considerable benefits in terms of both time and safety in being able to direct drivers around congested/trouble spots while enabling them to maintain their schedules. This is a benefit to both fleet operators and the traveling public.

Approximately 200,000 AVI tags will be made available in the San Francisco Bay Area early in 1996. Some of these tags will be applied to public transportation vehicles and vehicle fleets. Although the

purpose of this demonstration program is to study the impact the use of the tags will have on relieving congestion at toll plazas, it should give Caltrans valuable information about the use and acceptance of this technology. Caltrans should also be able to discern from the results and evaluation of this demonstration, the applicability and effectiveness of extending the use of these tags to gather real-time service information throughout the area.

Assuming that it is determined that the use of these tags can be successfully extended into this arena, a proposal can be made that all new vehicle procurements by the state (including those for other jurisdictions) require such equipment, and that the Department of General Services study ways of quickly retrofitting public fleet vehicles currently in use in California.

- **Privacy Protection in ATS Deployment**

To avoid any ambiguity as to intent, it should be made state policy that any and all ATS deployments in California involving governmental entities will ensure that the privacy of the citizens of California is protected. Under this policy, ATS designers will, to the extent feasible, design for privacy protection, as well as to primary application parameters. Any compromise of such protection on a specific product or application (for specific utility and/or convenience gains) should be knowingly, willfully and voluntarily agreed to by users of that product or application.

To attain the ATS vision, the collaborative effort necessary between federal, state, regional and local agencies, the private sector and research institutions will require management to use contractual and institutional approaches for which there are few, if any, U.S. models. The Caltrans management team will face challenges to:

- Test new transportation technologies in complex and developing systems environments to achieve near-term results that adequately demonstrate the program's lasting benefits to society;
- Facilitate commercialization of transportation technologies;
- Raise and selectively pool private matching funds and other resources to meet state and federal cost-sharing requirements;
- Cooperate in the management of large and complex projects supported both financially and technically by a variety of sources;
- Develop public/private partnerships with the ability to resolve differences in proprietary issues;
- Coordinate actions of state, regional, and local governmental agencies to plan, program, deploy, maintain and operate advanced systems;
- Operate successfully within changing political environments;
- Use risk management techniques when facing legal challenges;
- Gain consumer acceptance of new transportation products;

- Coordinate numerous and varied roles of governmental jurisdictions; and,
- Change the existing infrastructure which often limits options for new systems.

The ATS Program delivery strategies that follow address these challenges and also support broad state initiatives listed on page 74.

• **Regional Teaming**

Caltrans is working with its partners throughout the state in establishing coordination teams to oversee ATS Programs and activities in each region. Typically, these operate under memoranda of understanding with state, regional and local agencies and have advisory groups involving private industry and other participants.

These teams will also help facilitate the consideration of ATS deployment opportunities within mainstream transportation planning and programming processes (see Early Deployment Plans on page 77).

ATS Program Delivery Strategies

- **Regional Teaming**
- **PATH Research Support**
- **Joint UC/California Testbed**
- **Program Element on Institutional and Market Issues**
- **California Advanced Public Transportation Systems Element**
- **Use of Federal ITS Programs:**
 - **Early Deployment Plans**
 - **Field Operational Tests**
 - **Southern California ITS Priority Corridor**
 - **Automated Highway Prototype**
 - **ITS Architecture Development**
 - **Use of Federal Defense Conversion and other Programs**

Program Delivery Strategies

- **Partners for Advanced Transit and Highways (PATH)**

Ongoing research support for the ATS Program is provided by the PATH Program, ensuring continuity in the ATS research and development phases. Relevance and application of research products to transportation needs is ensured by ATS Program oversight of PATH.

- **California Testbed**

Using existing transportation facilities and services, Caltrans is helping establish testbeds for evaluating ATS technologies in real-world environments. The “California Testbed” initiative provides private industry and others opportunities to work with transportation practitioners and PATH researchers in developing useful ATS products. The first such testbed started operation in 1994, in Orange County, in partnership with the CHP, the cities of Anaheim and Irvine, the Orange County Transportation Authority, the University of California, Irvine and California Polytechnic State University, San Luis Obispo.

- **Environmental, Institutional and Market Issues Resolution**

Within their respective programs, Caltrans and the University of California are actively exploring approaches and solutions to the environmental, institutional and market issues discussed on the previous pages. New tools are being developed to conduct adequate and comprehensive ATS technology assessments, including socioeconomic and environmental consequences of ATS deployment.

- **ATS Program Planning**

Caltrans will regularly update and revise its ATS Program Plan to reflect changing conditions, needs and opportunities. In doing so, the department will solicit input from its partners and other interested parties. Caltrans is committed to coordinating the ATS Program with mainstream plans, programs, and operations (see Roles and Responsibilities, State Government, page 20).

Under AB 3096, Caltrans will regularly report to the administration and legislature on ATS Program progress.

- **Outreach Program**

Caltrans is recognized as a leader in the National ITS Program and holds membership on a variety of state and national committees including: the Transportation Research Board (TRB) Intermodal Transfer Facilities and Aircraft/Airport Compatibility Committees; the National Cooperative Highway Research Program (NCHRP); the ITS Rural Traveler Information Systems Expert Panel; the Western Transportation Institute’s Board of Directors; the American Association of State Highway and Transportation Officials (AASHTO) Research Advisory Committee; ITS America; and PATH. These activities are important in providing a forum to inform the public, program partners and other stakeholders about the scope, direction and benefits of the ATS Program and to receive valuable feedback about their needs and concerns.

In addition, ATS Program staff are members and/or chairpersons of a variety of Caltrans committees which promote and foster the discussion of ongoing and future projects related to transportation system concepts, direction and integration. Discussion with the production staff of major educational channels is also underway to feature information about Automated Vehicle Control System (AVCS) projects as part of their curriculum dealing with future transportation technologies.

- **California Advanced Public Transportation Systems (CAPTS)**

With support from the Federal Transit Administration (FTA) and Federal Highway Administration (FHWA), Caltrans is aggressively pursuing ITS applications in public transportation, ridesharing and paratransit operations through its California Advanced Public Transportation Systems (CAPTS) initiative. This ATS Program element has helped highlight the full multimodal range of ITS and ATS opportunities.

- **Advanced Highway Maintenance and Construction Technology (AHMCT)**

In partnership with UCD and FHWA, Caltrans seeks to reduce the cost of doing business through its AHMCT Program. This ATS Program element directs efforts towards implementing products and processes that improve the safety, efficiency and cost effectiveness of highway maintenance and construction operations.

Caltrans is taking advantage of a number of federal programs under ISTEA:

- **Early Deployment Plans**

With support from USDOT, Caltrans is working with regional teams in the Sacramento Metropolitan Area, the San Francisco Bay Area and Southern California to develop cooperative plans for deploying ATS products and services. These plans will address consistency with existing transportation and air quality plans and programs, as well as identifying fiscal requirements and sources for ATS deployment. This planning effort will be expanded to other areas in California, including rural areas.

- **Federal ITS Field Operational Tests**

California captured six of 16 projects awarded in the first round of USDOT's ITS Field Operational Test Program in 1993. These ongoing field tests address a variety of traveler information and transportation management system services and technologies, some utilizing the testbed capabilities outlined earlier in this section. The tests are being conducted in the San Francisco Bay Area, Los Angeles, Orange County and San Diego.

Caltrans participated in the second round by offering to provide matching funds to companies submitting proposals.

Program Delivery Strategies

- **Southern California ITS Priority Corridor**

Significant portions of Los Angeles, Orange, San Diego, Riverside and San Bernardino counties have been designated by USDOT as the Southern California ITS Priority Corridor, one of four in the nation. This designation allows the region to compete with other corridors for some \$250 million (through 1997) in special ISTEA funding to showcase ITS applications and promote early ITS deployment. Caltrans is working with the regional teams to develop a Priority Corridor deployment plan and demonstration projects in the corridor.

- **Automated Highway System Prototype**

Caltrans is a core participant in the National Automated Highway System Consortium (NAHSC). The NAHSC will define, specify, and develop a prototype working automated highway system by the year 2001. See page 125 for a more detailed discussion of this federal initiative.

- **Defense Conversion**

In 1993, the Advanced Research Projects Agency (ARPA), of the Department of Defense, released the first Technology Reinvestment Project (TRP) solicitation. The objective of the TRP is to fund dual-use projects that benefit both the military and commercial markets. Caltrans has participated in both solicitations released by the TRP by providing matching funds to partnerships with projects that address the needs of the ATS Program.

As a result of the 1993 solicitation, 85 projects were submitted to Caltrans. Twenty-one were selected to receive matching funds and 26 were endorsed. Four projects were selected to receive federal funding. ARPA selected two and the US Department of Energy (USDOE) was interested in two others. Subsequently these four projects were funded, and are currently underway.

- **ITS Architecture**

As discussed on page 68, Caltrans is participating in the development of a national architecture for Intelligent Transportation Systems (ITS).

The ATS Program is designed as an integrated approach for deployment of ATS technologies:

- User needs will be identified and filled through research and development and resulting systems evaluated via field operational tests; and,
- Development of guidelines, standards and protocol setting and consideration of ATS in transportation plans and programs will facilitate deployment.

Integrated approach



